

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Applicant:	Chengua O. Han	§	Art Unit:	3641
Serial No.:	10/027,727	§		
Filed:	December 21, 2001	§	Examiner:	Stephen Johnson
Title:	SHAPED CHARGE	§	Docket No.	22.1450
		§		(SHL.0227US)

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APPEAL BRIEF

Date of Deposit: February 15, 2010

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Janice Munoz

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REAL PARTY IN INTEREST

The real party in interest is Schlumberger Technology Corporation.

RELATED APPEALS AND INTERFERENCES

This application was the subject of Appeal 2008-6047, which resulted in a Decision on Appeal that was decided on December 18, 2008.

STATUS OF CLAIMS

The application was originally filed with claims 1-20. During prosecution of the application, claims 21-45 were added and claims 2-5, 8-16, 20, 21, 22, 24, 26, 27, 29, 31, 32, 34 and 36-41 were cancelled. Claims 1, 6, 17, 33, 42 and 44 have been finally rejected and are the subject of this appeal.

STATUS OF AMENDMENTS

There are no unentered amendments.

SUMMARY OF CLAIMED SUBJECT MATTER

At this point, no issue has been raised that would suggest that the words in the claims have any meaning other than their ordinary meanings. Nothing in this section should be taken as an indication that any claim term has a meaning other than its ordinary meaning.

The control debris perforating system of independent claim 1 includes a shaped charge that includes a charge case, which has a wall that defines a recessed region; an explosive material that is received in the recessed region; and a liner that is disposed in the charge case. The charge case defines at least one axially oriented slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material.

Fig. 1 depicts a shaped charge 1 of the prior art. The shaped charge 1 includes a charge case, an explosive 12 and a liner 14. The shaped charge case 1 is described beginning on line 16 of page 2 and extending through line 11 of page 3 of the specification. Specification, pp. 2-3.

In contrast to Fig. 1, Figs. 4 and 5 depict a possible embodiment of claim 1. These figures depict a shaped charge 40 that includes a charge case 44. The charge case 44 includes axially-oriented slots, or grooves 42, which are cut into the charge case 44 to weaken the case 44. Due to the weakened case at the grooves 42, the charge case 44 fractures along the grooves 42 upon firing of the shaped charge 40. Therefore, due to the grooves 42, the size and shape of debris that is generated by the charge case 44 may be more precisely controlled, as compared to conventional charge cases. Specification, pp. 3-4.

The method of independent claim 17 recites providing a perforating string that has one or more shaped charges. The shaped charges include a charge case that has a wall, which defines a recessed region; an explosive material that is received in the recessed region; and a liner that is disposed in the charge case. The charge case defines at least one axially-oriented slot about which the charge case is adapted to fracture in response to detonation of the explosive material. The method includes conveying the perforating string into the well.

The specification describes a perforating string that has the features described in the act of providing of claim 17. This embodiment is described in connection with the shaped charge 40 and its charge case 44. This perforating gun string may be conveyed into a well for firing. Specification, pp. 2-3.

Independent claim 33 recites a method of controlling debris during perforating. This method includes providing a shaped charge having a charge case that has a wall that defines a

recessed region; a liner disposed in the charge case; and an explosive that is received in the recessed region. The charge case defines at least one axially-oriented groove in the wall about which the charge case is adapted to fracture in response to detonation of an explosive.

The shaped charge 40 (a possible embodiment of claim 33) depicted in Figs. 4 and 5 has these features, as discussed above. Specification, pp. 3-4.

Independent claim 42 recites a controlled debris perforating system. The system includes a shaped charge that includes a charge case that has a wall defining a recessed region, which is adapted to receive a liner and an explosive material. The charge case defines at least one slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material.

The shaped charge 40 (a possible embodiment of claim 42), which is depicted in Figs. 4 and 5 has these features, as discussed above. Specification, pp. 3-4.

GROUND'S OF REJECTION TO BE REVIEWED ON APPEAL

- A. **Whether Claims 1, 33 and 42 Are Anticipated under 35 U.S.C. § 102(b) by German Patent Application Publication No. DE4001041 A1 (Frye)?**
 - 1. **Whether Claim 1 Is Anticipated under 35 U.S.C. § 102(b) by German Patent Application Publication No. DE4001041 A1 (Frye)?**
 - 2. **Whether Claim 33 Is Anticipated under 35 U.S.C. § 102(b) by German Application Publication Patent No. DE4001041 A1 (Frye)?**
 - 3. **Whether Claim 42 Is Anticipated under 35 U.S.C. § 102(b) by German Application Publication Patent No. DE4001041 A1 (Frye)?**
- B. **Whether Claim 17 Is Rendered Obvious under 35 U.S.C. § 103(a) As Being Unpatentable over German Patent Application Publication No. DE4001041 A1 (Frye) in View of U.S. Patent No. 2,742,857 (Turechek)?**
- C. **Whether Claims 6 and 44 Are Rendered Obvious under 35 U.S.C. § 103(a) As Being Unpatentable over German Application Publication No. DE4001041 A1 (Frye) in View of U.S. Patent No. 5,619,008 (Chawla)?**
- D. **Whether Claims 1, 33 and 42 Are Anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,047,505 (Willow)?**
 - 1. **Whether Claim 1 Is Anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,047,505 (Willow)?**
 - 2. **Whether Claim 33 Is Anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,047,505 (Willow)?**
 - 3. **Whether Claim 42 Is Anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,047,505 (Willow)?**
- E. **Whether Claims 6 and 44 Are Rendered Obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 6,047,505 (Willow) in View of U.S. Patent No. 5,619,008 (Chawla)?**

ARGUMENT

- A. **Whether Claims 1, 33 and 42 Are Anticipated under 35 U.S.C. § 102(b) by German Patent Application Publication No. DE4001041 A1 (Frye)?**
1. **Whether Claim 1 Is Anticipated under 35 U.S.C. § 102(b) by German Patent Application Publication No. DE4001041 A1 (Frye)?**

The control debris perforating system of independent claim 1 includes a shaped charge that has a charge case, which has a wall that defines a recessed region; an explosive material that is received in the recessed region; and a liner that is disposed in the charge case. The charge case defines at least one axially oriented slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material.

Independent claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by German Patent Application Publication No. DE4001041 A1 (hereinafter called "Frye"). As the text of Frye is in German, the § 102 rejection is based on the figures of Frye, which appear to disclose a shaped charge. The § 102 rejection of claim 1 is deficient for at least the reason that the Examiner relies on a document that is in a language other than English, and the Examiner is relying on that document without obtaining a translation. Therefore, the § 102 rejection of claim 1 is in error for at least the reason that the record is unclear as to the precise facts that the Examiner is relying upon in support of the rejection. M.P.E.P. § 706.02. Although the Final Office Action only references elements of Frye's figures, as set forth below, whether Frye anticipates claim 1 or not cannot be determined without referencing the underlying text.

In order to anticipate a claim under 35 U.S.C. § 102, a single reference must teach each and every element of the claim. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). In fact, "[t]he identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989). Furthermore, in order for a reference to be anticipatory, "[its] elements must be arranged as required by the claim." *In re Bond*, 910 F.2d 831 (Fed. Cir. 1990), cited in M.P.E.P. § 2131.

Regarding the § 102 rejection of claim 1 in view of Frye, Frye fails to anticipate claim 1 for at least the reason that Frye fails to disclose a shaped charge that has a wall that defines a recessed region that receives a liner and an explosive, where at least one axially oriented slot exists in the wall. Based on the figures, Frye appears to disclose a shaped charge 18 that

includes a shaped charge body 16, which receives a liner 12 and an explosive 14; and a ring 10 appears to attach to the body 16 at an element 26/30. The ring 10 also appears in Fig. 3 to contain elements 32 and 34, which are labeled as slots by the Examiner. The Examiner contends that either element 26/30 (Fig. 1), 32 (Fig. 3) or 34 (Fig. 3) discloses the axially oriented slot of claim 1. Final Office Action, p. 2. Due to the underlying text of Frye being unavailable, Applicant submits that the § 102 rejection is in error for at least the additional, independent reason that Frye fails to disclose a slot in the shaped charge 18, as it unclear whether any of elements 26/30, 32 and 34 are slots. Thus, due to the failure of Frye's figures to disclose a slot, the § 102 rejection of claim 1 is in error. M.P.E.P. § 706.02. For purposes of argument, it is assumed below that elements 26/30, 32 and 34 are grooves.

Referring to Fig. 1 of Frye, the groove 26/30 is radially oriented and appears to define an annularly recessed region for receiving the ring 10. Therefore, contrary to the claimed invention, the groove 26/30 (the alleged slot) does not extend along an axis and thus, is not axially oriented, contrary to the express claim limitations. Moreover, the groove 26/30 is disposed at the upper edge of the body 16 to receive the ring 10 of the shaped charge 18. The skilled artisan would not have gleaned from Fig. 1 that the wall of the body 16 is adapted to fracture about, or around, an edge-disposed groove 26/30 in response to detonation of the explosive 14, contrary to the express claim limitations. Thus, without some underlying teaching of Frye (which is unavailable due to no English translation being provided, contrary to M.P.E.P. § 706.02) disclosing that Frye's body 16 fractures about the groove 26/30 in response to detonation of explosive 14, a *prima facie* case of anticipation has not been set forth for claim 1.

It is noted that contrary to the position that is taken by the Examiner, the charge case wall of Frye may very well be less likely or no more likely to fracture about the groove 26/30 than any other part of Frye's shaped charge due to the reinforcement by the ring 10, which is in place when the charge fires. Thus, the figures of Frye, which are relied on by the Final Office Action fail to explicitly or inherently teach a charge case that is adapted to fracture about a groove formed in a wall of the case.

The grooves 32 and 34 are located in the ring 10 and are not, contrary to the claimed invention, in a wall that defines a recessed region in which a liner is disposed and in which an explosive material is received (emphasis added). Furthermore, contrary to the express language of claim 1, the grooves 32 and 34 are radially, not axially, oriented. Additionally, the figures of

Frye fail to inherently or explicitly disclose that the charge case 18 is adapted to fracture about either of the grooves 32 and 34.

Thus, for at least any of the foregoing reasons, the § 102 rejection of independent claim 1 is in error and should be reversed.

2. Whether Claim 33 Is Anticipated under 35 U.S.C. § 102(b) by German Patent Application Publication No. DE4001041 A1 (Frye)?

Independent claim 33 recites a method of controlling debris during perforating. This method includes providing a shaped charge having a charge case that has a wall that defines a recessed region; a liner disposed in the charge case; and an explosive that is received in the recessed region. The charge case defines at least one axially-oriented groove in the wall about which the charge case is adapted to fracture in response to detonation of an explosive.

Independent claim 33 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Frye. The § 102 rejection of claim 33 is in error for at least the reason that the Examiner relies on a document that is in a language other than English, and the Examiner is relying on that document without obtaining a translation. M.P.E.P. § 706.02.

Additionally, Frye fails to anticipate independent claim 33, as the figures of Frye, which are relied on by the Examiner, fail to disclose a number of features of this claim. For example, Frye fails to disclose a shaped charge that has a charge case that has a wall that defines a recessed region (which receives an explosive material and in which a liner is disposed), where at least one axially-oriented groove is in the wall. Instead, the grooves 26/30, 32 and 34 are radially oriented and do not extend along an axis. Furthermore, the grooves 32 and 34 are not formed in a wall that defines a recessed region in which a liner is disposed and in which an explosive is received, as claimed. Moreover, the skilled artisan, in view of Frye's figures, would not have been apprised that the charge body 16 is adapted to fracture about any of the grooves 26/30, 32, or 34.

Thus, for at least the foregoing reasons, § 102 rejection of claim 33 is in error and should be reversed.

3. Whether Claim 42 Is Anticipated under 35 U.S.C. § 102(b) by German Patent Application Publication No. DE4001041 A1 (Frye)?

Independent claim 42 recites a controlled debris perforating system. The system includes a shaped charge that includes a charge case that has a wall defining a recessed region, which is adapted to receive a liner and an explosive material. The charge case defines at least one slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material.

Claim 42 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Frye. The §102 rejection of claim 42 is in error for at least the reason that the Examiner relies on a document that is in a language other than English, and the Examiner is relying on that document without obtaining a translation. M.P.E.P. § 706.02.

The § 102 rejection of claim 42 is in error for at least the additional, independent reason that the figures of Frye, which are relied on by the Examiner, fail to disclose several features of claim 42, such as a slot in a wall (which receives a recessed region to receive a liner and an explosive material) about which the charge is adapted to fracture, for the reasons that are set forth above in the discussions of claims 1 and 33.

Thus, for at least any of the foregoing reasons, § 102 rejection of claim 42 is in error and should be reversed.

B. Whether Claim 17 Is Rendered Obvious under 35 U.S.C. § 103(a) As Being Unpatentable over German Patent Application Publication No. DE4001041 A1 (Frye) in View of U.S. Patent No. 2,742,857 (Turechek)?

The method of independent claim 17 recites providing a perforating string that has one or more shaped charges. The shaped charges include a charge case that has a wall, which defines a recessed region; an explosive material that is received in the recessed region; and a liner that is disposed in the charge case. The charge case defines at least one axially-oriented slot about which the charge case is adapted to fracture in response to detonation of the explosive material. The method includes conveying the perforating string into the well.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Frye in view of U.S. Patent No. 2,742,857 (hereinafter called "Turechek"). Turechek discloses a gun perforator that includes shaped charges.

The § 103 rejection of claim 17 is in error for at least the reason that the Examiner relies on a document that is in a language other than English, and the Examiner is relying on that document without obtaining a translation. M.P.E.P. § 706.02.

To make a determination under 35 U.S.C. § 103, several basic factual inquiries must be performed, including determining the scope and content of the prior art, and ascertaining the differences between the prior art and the claims at issue. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459 (1965). Moreover, as the U.S. Supreme Court held, it is important to identify a reason that would have prompted a person of ordinary skill in the art to combine reference teachings in the manner that the claimed invention does. *KSR International Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741, 82 U.S.P.Q.2d 1385 (2007).

The § 103 rejection of independent claim 17 is in error for at least the additional, independent reason that the hypothetical combination of Frye and Turechek fails to disclose a charge case that defines at least one axially oriented slot in a wall about which the charge case is adapted to fracture in response to detonation of an explosive material. In this manner, as discussed above, the figures of Frye fail to disclose or render obvious the above-recited combination of elements; and Turechek fails to cure the deficiencies of Frye. It is noted that due to the translation of Frye being unavailable, Applicant is precluded from considering Frye's teaching as a whole, which might set forth facts that teach against the combination of Frye and Turechek, for example.

Turechek is merely relied on by the Examiner for its purported disclosure of a perforating gun string. However, Turechek fails to disclose or render claim limitations that are neither disclosed nor rendered obvious by Frye's figures, such as providing a perforating string that has shaped charges that include a charge case that has a wall defining a recessed region that receives an explosive material and a liner, where the charge case defines at least one axially oriented slot in the wall about which the charge case is adapted to fracture in response to the detonation of the explosive material. Furthermore, the Final Office Action fails to provide any plausible reason to explain why one of skill in the art in possession of Frye and Turechek would have otherwise derived the missing claim limitations.

Thus, for at least any of the foregoing reasons, the § 103 rejection of claim 17 is in error and should be reversed.

C. Whether Claims 6 and 44 Are Rendered Obvious under 35 U.S.C. § 103(a) As Being Unpatentable over German Patent Application Publication No. DE4001041 A1 (Frye) in View of U.S. Patent No. 5,619,008 (Chawla)?

Claim 6 depends from claim 1 and recites that the axially-oriented about which the charge is adapted to fracture is a V-notched groove. Claim 44 depends from independent claim 42 and recites that the slot in the wall of the charge case is a V-notched groove.

Claims 6 and 44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Frye in view of U.S. Patent No. 5,619,008 (hereinafter called "Chawla"). Chawla generally discloses a technique to manufacture liners, such as liners 36 that are shown in Fig. 4 of Chawla. As depicted in Fig. 4 of Chawla, at a particular step in the manufacturing process, the liners 36 are part of a solid sheet. Score marks 46 are formed in the sheet to facilitate breaking of the individual liners 36 from this solid sheet. Chawla, 3:64-67.

The § 103 rejection of claims 6 and 44 are in error for at least the reason that the Examiner relies on a document that is in a language other than English, and the Examiner is relying on that document without obtaining a translation. Furthermore, Applicant cannot fully address the § 103 rejections without having access to Frye's complete disclosure.

Claims 6 and 44 overcome the § 103 rejections for at least the reasons that these claims depend from allowable claims, for the reasons that are set forth above. Claims 6 and 44 are patentable for the additional, independent reasons that are set forth below.

Applicant submits that the § 103 rejection of claims 6 and 44 are deficient for at least the additional, independent reason that the Examiner has failed to set forth any plausible reason to explain why the skilled artisan in possession of Frye and Chawla would have derived the claimed invention, absent impermissible hindsight gleaned from the current application. In this regard, Chawla merely discloses using score marks to facilitate the manufacturing of a liner. Independent claims 1 and 42 (from which claims 6 and 44 depend) clearly set forth a charge case. As such, the liner of Chawla cannot be considered the charge case of claims 6 and 44, as there is nothing in Chawla that would lead the skilled artisan to believe that Chawla's liner would be substituted into Frye's shaped charge to receive a liner and an explosive material, as explicitly claimed. Thus, contrary to the position that is taken by the Examiner, Chawla fails to disclose or render obvious forming any type of slot in a wall of a charge case, , as defined in claims 1 and 42.

Furthermore, there is no disclosure in Chawla that its liner 36 is adapted to fracture about the score mark in response to the detonation of an explosive, and Chawla fails to disclose that the score mark 36 even exists after manufacture of the liner 36. Thus, the skilled artisan in possession of Frye and Chawla would not be led to modify Frye's groove 26/30, 32 or 34 to make it V-shaped as the purpose of Frye's groove 26/30, 32 or 34 does not appear (from the figures) to be related to manufacturing or the manufacturing of a liner. Therefore, the Examiner fails to explain why the skilled artisan would have modified Frye's shaped charge to impart a V-shaped cross-section in the groove 26/30, 32 or 34, absent impermissible hindsight gleaned from the current application.

Thus, for at least any of the foregoing reasons, the § 103 rejections of claims 6 and 44 are in error and should be reversed.

D. Whether Claims 1, 33 and 42 Are Anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,047,505 (Willow)?

1. Whether Claim 1 Is Anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,047,505 (Willow)?

The control debris perforating system of independent claim 1 includes a shaped charge that has a charge case, which has a wall that defines a recessed region; an explosive material that is received in the recessed region and a liner that is disposed in the charge case. The charge case defines at least one axially oriented slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material.

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,047,505 (hereinafter called "Willow"). Willow generally directed to a bearing pile, which is driven into the ground as a support for structures, such as buildings, bridges or wharves. Willow, 1:6-9. In particular Willow discloses initially driving the bearing pile 11 into the ground and then activating an explosive 27 to expand a lower end 22 of pile 11 into strips 23 to further support the pile 11, as illustrated in Fig. 4 of Willow. Willow, 3:53-65 and 4: 30-49. Willow states that the explosive 27 is a detonating cord that is formed in a ring. Willows, 4:37-40.

Claim 1 explicitly recites a combination of features that are not taught by Willows, such as a shaped charge that includes a liner and an explosive. The Final Office Action labels various components of Willow's bearing pile 11 as being the purported elements of claim 1, such as an

explosive 27 (the purported explosive material of claim 1), earth piercing shoe 16 (the purported liner of claim 1) and pipe 12 (the purported charge case of claim 1). Final Office Action, p. 3.

The earth piercing shoe 16 cannot be considered the liner of claim 1, however, as the shoe 16 is not disposed in the pipe 12 (the purported charge case), contrary to the explicitly recited limitations of claim 1, which set forth that the liner is disposed in the charge case (emphasis added). See, for example, Fig. 2 of Willow. Furthermore, it is entirely unclear why or how the shoe 16 functions as a liner. Thus, for at least the reason that Willow fails to disclose a liner that is disposed in a case, Willow fails to anticipate claim 1.

Even assuming, *arguendo*, that Willow discloses a case, liner and an explosive, Wilson still fails to disclose a shaped charge and for at least this additional, independent reason fails to anticipate claim 1. In this manner, the language "shaped charge" has a well-recognized meaning in the art, as the skilled artisan understands that a "shaped charge" focuses explosive energy, with a common example being a shaped charge that is used in a downhole perforating operation to produce a perforating jet, as described par. no. [0018] of the application. The Examiner's reading of claim 1 onto Willow's bearing pile 11 has improperly rendered the "shaped charge" language of this claim meaningless, as under the Examiner's effective construction, any apparatus that includes a liner, explosive and case is a shaped charge. Contrary to this construction of "shaped charge," it is entirely possible for an apparatus to have to have a liner, case and an explosive without the device being a shaped charge. As an analogy, although an apparatus may include a handle and wheels, it does not necessarily follow that the apparatus is an automobile, as, for example, a rolling suitcase also has a handle and wheels.

Willow's bearing pile 11 fails to focus explosive energy. Rather, the energy produced by Willow's detonating cord 27 (the purported explosive) is omnidirectional, as Willow fails to disclose features to focus explosive energy consistent with features of a shaped charge. Instead, the detonating wave on Willow's detonating cord results in creation and expansion of the strips 23 around the entire periphery of the bearing pile 11, as illustrated in Fig. 4 of Willow. Therefore, the skilled artisan would not consider Willow's bearing pile 11 to focus energy consistent with the operation of a shaped charge and as such would not have been apprised of a shaped charge with the features recited in claim 1 in view of Willow's disclosure.

Thus, for at least any of the foregoing reasons, the § 102 rejection of claim 1 is in error and should be reversed.

2. Whether Claim 33 Is Anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,047,505 (Willow)?

Independent claim 33 recites a method of controlling debris during perforating. This method includes providing a shaped charge having a charge case that has a wall that defines a recessed region; a liner disposed in the charge case; and an explosive that is received in the recessed region. The charge case defines at least one axially-oriented groove in the wall about which the charge case is adapted to fracture in response to detonation of an explosive.

Claim 33 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Willow. Willows fails to anticipate this claim, however, as Willows fails to disclose either a liner disposed in a charge case or the act of providing a shaped charge, for the reasons that are set forth above in the discussion of claim 1.

Thus, for at least the foregoing reasons, the § 102 rejection of claim 33 is in error and should be reversed.

3. Whether Claim 42 Is Anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 6,047,505 (Willow)?

Independent claim 42 recites a controlled debris perforating system. The system includes a shaped charge that includes a charge case that has a wall defining a recessed region, which is adapted to receive a liner and an explosive material. The charge case defines at least one slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material.

Claim 42 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Willow. However, Willows fails to anticipate this claim for at least the reasons that Willow fails to disclose a shaped charge and Willows fails to disclose a liner that is received in a recess defined by a wall of a charge case, as discussed above for claim 1.

Thus, for at least the foregoing reasons, the § 102 rejection of claim 42 is in error and should be reversed.

E. Whether Claims 6 and 44 Are Rendered Obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 6,047,505 (Willow) in View of U.S. Patent No. 5,619,008 (Chawla)?

Claim 6 depends from claim 1 and recites that the axially-oriented about which the charge is adapted to fracture is a V-notched groove. Claim 44 depends from independent claim 42 and recites that the slot in the wall of the charge case is a V-notched groove.

Claims 6 and 44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Willow in view of Chawla.

Claims 6 and 44 overcome the § 103 rejections for at least the reasons that these claims depend from allowable claims, for the reasons that are set forth above. Claims 6 and 44 are patentable for the additional, independent reasons that are set forth below.

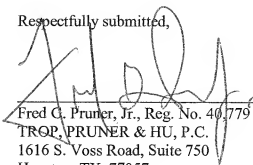
Applicant submits that the § 103 rejection of claims 6 and 44 are deficient for at least the reason that the Examiner has failed to set forth any plausible reason to explain why the skilled artisan in possession of Willow and Chawla would have derived the claimed invention. In this regard, Chawla merely discloses score marks using the manufacturing process of a liner. Independent claims 1 and 42 (from which claims 6 and 44 depend) clearly set forth a charge case that is adapted to receive a liner. As such, the liner of Chawla cannot be considered the charge case of claims 6 and 44, as the skilled artisan would not have been led to dispose a liner and explosive material in Chawla's liner in a shaped charge. Therefore, contrary to the position that is taken by the Examiner, Chawla fails to disclose or render obvious forming any type of groove in a charge case. Furthermore, there is no disclosure in Chawla that the liner 36 is adapted to fracture about the score mark, and there is no disclosure in any portion of Chawla that the score mark 36 even exists (for purposes of argument) after manufacture of the liner 36. Moreover, the Final Office Action fails to set forth any plausible reason to explain why a V-shaped groove would have been incorporated into Willow's pipe 12 (the alleged "case") , absent impermissible hindsight gleaned from the current application.

Thus, for at least any of the foregoing reasons, the § 103 rejections of claims 6 and 44 are in error and should be reversed.

Applicant respectfully requests that each of the final rejections be reversed and that the claims subject to this Appeal be allowed to issue.

Respectfully submitted,

Date: February 15, 2010



Fred C. Pruner, Jr., Reg. No. 40,779
TROP, PRUNER & HU, P.C.
1616 S. Voss Road, Suite 750
Houston, TX 77057
713/468-8880 [Phone]
713/468-8883 [Fax]

CLAIMS APPENDIX

The claims on appeal are:

1. A controlled debris perforating system, comprising:
a shaped charge comprising a charge case having a wall defining a recessed region, an explosive material received in the recessed region and a liner disposed in the charge case, the charge case defining at least one axially oriented slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material.
6. The controlled debris perforating system of claim 1, wherein the at least one slot is a V-notched groove.
7. The controlled debris perforating system of claim 1, wherein the at least one slot is an external slot.
17. A method of using one or more shaped charges in a well, comprising:
providing a perforating string having one or more shaped charges, the shaped charges comprising a charge case having a wall defining a recessed region, an explosive material received in the recessed region and a liner disposed in the charge case, the charge case defining at least one axially oriented slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material; and
conveying the perforating string into the well.
18. The method of claim 17, wherein the perforating string comprises a loading tube and carrier.
19. The method of claim 17, wherein the perforating string comprises a spiral gun.
23. The controlled debris perforating system of claim 1, wherein said at least slot comprises at least one groove formed in the wall of the case.

25. The controlled debris perforating system of claim 23, wherein said at least one groove is cut into the wall of the case.

28. The method of claim 17, wherein said at least slot comprises at least one groove formed in the wall of the case.

30. The method of claim 28, wherein said at least one groove is cut into the wall of the case.

33. A method of controlling the debris during perforating, comprising:
providing a shaped charge comprising a charge case having a wall defining a recessed region, a liner disposed in the charge case and an explosive received in the recessed region, the charge case defining at least one axially-oriented groove in the wall about which the charge case is adapted to fracture in response to detonation of an explosive.

35. The method of claim 33, wherein said at least one groove is located on the outside of the charge case.

42. A controlled debris perforating system, comprising:
a shaped charge comprising a charge case having a wall defining a recessed region, the recessed region adapted to receive a liner and an explosive material and the charge case defining at least one slot in the wall about which the charge case is adapted to fracture in response to detonation of the explosive material.

43. The controlled debris perforating system of claim 42, wherein the at least one slot is axially oriented.

44. The controlled debris perforating system of claim 42, wherein the at least one slot is a V-notched groove.

45. The controlled debris perforating system of claim 42, wherein the at least one slot is an external slot.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

A copy of the Decision on Appeal that was decided on December 18, 2008 is attached.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SCHLUMBERGER TECHNOLOGY INFORMATION

Appeal 2008-6047
Application 10/027,727
Technology Center 3600

Decided: December 18, 2008

Before JAMESON LEE, RICHARD TORCZON, and SALLY C.
MEDLEY, *Administrative Patent Judges*.

LEE, *Administrative Patent Judge*.

DECISION ON APPEAL

A. STATEMENT OF THE CASE

This is a decision on appeal by the real party in interest, Schlumberger Technology Information (STI), under 35 U.S.C. § 134(a) from a final rejection of claims 1, 7, 17, 18, 22, 23, 25, 27, 28, 30, 33, and 35. STI

requests reversal of the Examiner's rejection of those claims. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

References Relied on by the Examiner

Renfro et al.	5,619,008	Apr. 8, 1997
Chawla et al.	6,619,176	Sep. 16, 2003

The Rejections on Appeal

The Examiner rejected claims 1, 7, 17, 22, 23, 25, 27, 28, 30, 33, and 35 under 35 U.S.C. § 102(e) as anticipated by Renfro et al. (Renfro).

The Examiner rejected claims 17 and 18 under 35 U.S.C. § 102(b) as anticipated by Chawla et al. (Chawla).

The Invention

The invention relates to controlling the debris generated by the shaped charges during a perforating operation. (Spec. 1:¶ 1.)

Claims 1 and 17 are reproduced below (Claims App'x 17:2-5; 12-16):

1. A controlled debris perforating system, comprising:

a shaped charge having a charge case and an explosive material, the charge case defining at least one slot about which the charge case is adapted to fracture in response to detonation of the explosive material.

17. A method of using one or more shaped charges in a well, comprising:

providing a perforating string having one or more shaped charges, the shaped charges comprising a charge case defining at least one slot about which the charge case is adapted to fracture; and

conveying the perforating string into the well.

B. ISSUES

1) Does the evidence on this record establish that the term “charge case” is a term of art with an established meaning in the art?

2) Has STI shown that the Examiner erred in finding that Renfro’s liner 50 forms part of a “charge case?”

3) Has STI shown that the Examiner erred in finding that Chawla’s liner 36 forms a “charge case” and includes slots that are “adapted to fracture?”

C. FINDINGS OF FACT

1. STI’s specification does not define “charge case” as being limited to a particular structure.

2. Renfro discloses that a shaped-charge “includes the usual case, concave shaped explosive material packed against the inner wall of the case, and a metal liner lining the concave side of the shaped explosive.” (Renfro 1:21-27.)

3. That section of Renfro does not use the claim term “charge case.”

4. Renfro uses the term “charge case” only once in the context of describing prior art techniques for creating explosive material. (Renfro 1:65.)

5. Renfro does not identify a “charge case” by reference character.

6. Chawla does not use the term “charge case.”

7. The Examiner cited a definition of the term “case” as meaning either a “container, as a box, crate, sheath, folder, etc.” or “a protective cover or covering part.” (Ans. 4:18-19.)

8. Renfro’s Figure 1 is reproduced below:

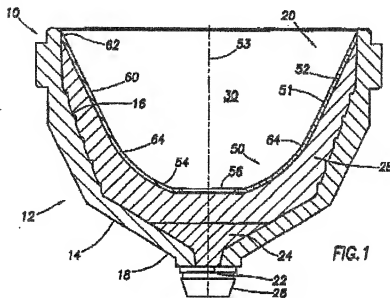


Figure 1 shows a cross-section of an assembled shaped-charge.

9. As shown in Renfro’s Figure 1, a shaped explosive 28 is contained between the skirt portion 60 of liner 50 and housing 12.

10. Housing 12 includes an outer wall 14 and an inner wall 16.
(Renfro 7:27-28)

11. Renfro expressly discloses that both the liner 50 and inner wall 16 are elements that bound the shaped explosive 28 (Renfro 7:55-57):

Except at the opening 56, the shaped explosive 28 is bounded by the housing inner wall 16, the initiation charge 24, and the convex outer surface 52 of the liner 50.

12. Renfro discloses that liner 50 undergoes a machining process. That process is disclosed as forming (Renfro 3:66 to 4:4):

a series of striations in the physical exterior of the skirt portion of the liner. This may encourage break up of the liner into smaller components during explosion reducing both the size of the carrot or slug and the total amount of debris, as the smaller components are more easily consumed by the explosion itself.

13. Chawla discloses a liner 36 with indentations 38 having cavities 40 that receive explosive charges 18 to form shaped charges 44. (Chawla 3:38-49.)

14. Chawla expressly discloses that the liner 36 forms a "housing for carrying shaped charges 44." (Chawla 3:49-50.)

15. In Chawla, liner 36 is scored along marks 46 to form "clean breaks" in the liner surface. (Chawla 3:65-67.)

16. The clean breaks allow the liner to be "rolled, folded, fastened, or otherwise shaped to create a desired geometric exterior shape for insertion in a wellbore or other target environment." (Chawla 3:67 to 4:3.)

17. Chawla discloses that the desired geometric shapes include "planar, oval, spherical, hemispherical, cylindrical, or any other desired shape." (Chawla 4:3-7.)

18. Chawla's Figure 4 shows a single liner 36 with a planar shape. (Chawla 4:23-24.)

19. Chawla's Figure 4 is reproduced below:

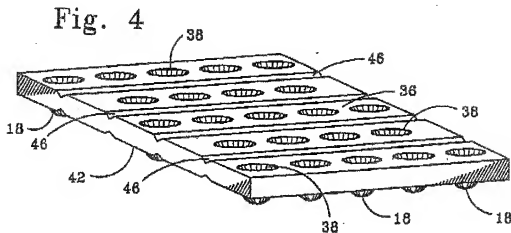


Figure 4 depicts a planar liner 36 that has multiple score marks 46 between rows of shaped charges. (Chawla 3:56-67.)

20. A person of ordinary skill in the art would have understood that thinner portions of liner characterized by less material have less strength than thicker portions with more material.

21. None of Chawla's Figures show a liner with less than multiple columns of shaped charges.

22. Chawla's Figure 5 shows one embodiment of an apparatus in which a liner 36 is formed into a cylindrical shape suitable for insertion within a well. (Chawla 4:8-10.)

23. Liner 36 surrounds a detonator 34 and includes a plurality of shaped charges 44 arranged along the length of the liner. (Chawla 4:10-13.)

24. Upon detonation, the plurality of shaped charges 44 produce "perforating jets" that may be oriented in multiple directions to achieve maximum penetrating density within the well. (Chawla 4:20-28.)

D. PRINCIPLES OF LAW

To establish anticipation under 35 U.S.C. § 102, each and every element in a claim, arranged as is recited in the claim, must be found in a single prior art reference. *Karsten Manufacturing Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001).

During examination, claim terms are given their broadest reasonable interpretation consistent with the specification. *In re Prater*, 415 F.2d 1393, 1404 (CCPA 1969).

E. ANALYSIS

The Examiner rejected claims 1, 7, 17, 22, 23, 25, 27, 28, 30, 33, and 35 as anticipated by Renfro. The Examiner also rejected claims 17 and 18 as anticipated by Chawla. STI argues the two grounds of rejection separately.

The rejection based on Renfro

We focus on the disputed limitations. The dispute centers on a limitation in each of independent claims 1, 17, and 33 relating to a charge case that is adapted to fracture.

In claim 1 the limitation reads (Claims App'x 17: 3-5):

the charge case defining at least one slot about which the charge case is adapted to fracture in response to detonation of the explosive material.

In claim 17 (Claims App'x 17:13-15):

the shaped charges comprising a charge case defining at least one slot about which the charge case is adapted to fracture.

In claim 33 (Claims App'x 12-13):

providing a shaped charge having a charge case defining at least one groove about which the charge case is adapted to fracture in response to detonation of an explosive.

The Examiner found that Renfro discloses a shaped charge with charge case formed by elements 14, 50, 60 taken together. (Ans. 3:18.) The Examiner also found that Renfro discloses, at column 5, lines 39-50, a plurality of slots about which the charge case fractures. (Ans. 3:21.) The section of Renfro cited by the Examiner describes a liner 50 with a skirt portion 60 that is machined to remove selective portions of material by "cutting, lathing, grinding, threading, scoring, and the like" (Renfro 5:42-45) in order to "provide proved improved break-up properties in the skirt portion of the liner, resulting in reduced debris" (Renfro 5:49-50). The Examiner explained that because liner 50 and skirt 60 form part of Renfro's "charge case," the removal of material from those components satisfies the requirement of slots or grooves that are adapted to fracture in response to detonation of explosive material. (Ans. 4:13-15.) The Examiner relied on a definition of the term "case" as meaning either a "container, as a box, crate, sheath, folder, etc." or "a protective cover or covering part" in support of the position that Renfro's liner 50 and skirt 60 are properly considered a "charge case." (Ans. 4:18-19.)

STI argues that the term "charge case" is a term of art in the field of shaped charges and that a person of ordinary skill in the art would not use a definition of "case" from a non-technical dictionary for the meaning of "charge case." (Reply Br. 2:1-9.) STI contends that the meaning of "charge case" excludes treating Renfro's liner 50 as forming any portion of a "charge

case.” (Reply Br. 2:10-19.) According to STI, liner 50 is not even a container or a covering part for a shaped charge. (Reply Br. 3:1-18.)

STI’s specification does not define “charge case” or require that it is limited to a particular structure. To support its position that the term has a special meaning established in the art, STI relies only on a description in the Background section of Renfro which discloses that a shaped-charge “includes the usual case, concave shaped explosive material packed against the inner wall of the case, and a metal liner lining the concave side of the shaped explosive.” (Reply Br. 2:10-17 citing Renfro 1:21-27.) That section of Renfro is nebulous and does not use the claim term “charge case.” The description of a “usual case,” whatever that means, and a “metal liner” does not establish that the term “charge case” is a term of art with a well known and established special meaning. Neither does it establish that “charge case” is limited to only the “usual case” and excludes other components such as the “metal liner.” STI has submitted no testimony from any technical witness with regard to the alleged “term of art” nature of a “charge case” or with respect to what constitutes a “usual case.”

The Examiner relied on both Renfro and Chawla as evidence in the field of explosive shaped charges. Neither reference identifies a “charge case” by reference character. Indeed, Chawla does not even use the term “charge case.” In Renfro, that term appears only once in the context of describing prior art techniques for creating explosive material. (Renfro 1:65.) Renfro does not provide any further detail as to what constitutes a “charge case.”

On this record, STI has not established that “charge case” has a special and particular meaning as a term of art in the shaped explosive charge art.

Renfro’s Figure 1 is reproduced below:

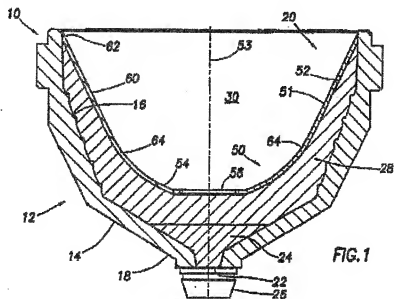


Figure 1 shows a cross-section of an assembled shaped-charge.

As shown in Renfro’s Figure 1, a shaped explosive 28 is contained between the skirt portion 60 of liner 50 and housing 12. (Renfro 7:27-28) Housing 12 includes an outer wall 14 and an inner wall 16. Renfro expressly provides that both the liner 50 and inner wall 16 are elements that bound the shaped explosive 28 (Renfro 7:55-57):

Except at the opening 56, the shaped explosive 28 is bounded by the housing inner wall 16, the initiation charge 24, and the convex outer surface 52 of the liner 50.

During examination, claim terms are given their broadest reasonable interpretation consistent with the specification. *In re Prater*, 415 F.2d at 1404. Renfro’s Figure 1 shows that liner 50 serves as a component covering

the top of shaped explosive 28. The above-quoted section discloses that liner 50 is a bounding portion of the shaped explosive 28. In light of those teachings, the Examiner found that liner 50 acts as a covering part of the shaped explosive. The Examiner relied on a meaning of “casing” that includes “a protective cover or covering part.” That meaning is reasonable and is not inconsistent with STI’s specification. In Renfro, both liner 50 and the inner wall 16 of housing 12 form covering portions for the shaped explosive 28. The Examiner reasonably determined that the liner and housing taken together form a “charge case.”

Furthermore, Renfro discloses that liner 50 undergoes a machining process. That process is disclosed as forming (Renfro 3:66 to 4:4):

a series of striations in the physical exterior of the skirt portion of the liner. This may encourage break up of the liner into smaller components during explosion reducing both the size of the carrot or slug and the total amount of debris, as the smaller components are more easily consumed by the explosion itself.

The Examiner found that those striations formed in the skirt portion of liner 50 satisfy the requirement of either a groove or slot “about which the charge case is adapted to fracture in response to detonation” of an explosive material. STI does not contest the finding that the striations are grooves or slots. In the above-quoted section, Renfro expressly discloses that the striations encourage break up of the liner during explosion. That is, Renfro’s liner 50 is adapted to fracture about the striations in response to detonation of explosive material 28. Because liner 50 forms part of a charge case, the striations are also part of the charge case. STI has not shown that the Examiner erred in determining that Renfro discloses a charge case that

defines a slot or groove about which the charge case is adapted to fracture in response to detonation of explosive material.

For the foregoing reasons, we sustain the rejection of 1, 17, and 33 under 35 U.S.C. § 102(e) as anticipated by Renfro.

STI does not separately argue dependent claims 7, 22, 23, 25, 27, 28, and 30. We also sustain the rejection of claims 7, 22, 23, 25, 27, 28, 30, and 35 under 35 U.S.C. § 102(e) as anticipated by Renfro.

The rejection based on Chawla

The Examiner rejected claims 17 and 18 as anticipated by Chawla. Claim 18 is argued collectively with claim 17. STI disputes that Chawla satisfies the limitation of “providing a perforating string having one or more shaped charges, the shaped charges comprising a charge case defining at least one slot about which the charge case is adapted to fracture.”

The Examiner found that Chawla’s liner 36 forms a charge case for explosive charges 18 and identified the configuration in Chawla’s Figure 5 as showing the step of providing a perforating string. The Examiner further found that Chawla teaches forming score marks 46 in the liner 36 and that those score marks form a plurality of slots about which the liner is adapted to fracture. (Ans. 4:4-8.)

STI contends that Chawla’s score marks 46 are only present during a manufacturing step and only facilitate breaking of individual liners 36 from a solid sheet. (App. Br. 14:3-6.) STI argues that Chawla does not disclose that the score marks are present once the charge case is finally formed. According to STI, even if the marks are still present, those marks are not disclosed as being adapted to fracture. STI also contends that a liner can not even constitute a charge case of a shaped charge. (App. Br. 14:8-16.) STI

further contends that the Examiner has not shown where Chawla discloses providing a perforating string. (Reply. Br. 5:13-14.)

STI's arguments are not persuasive.

Chawla discloses a liner 36 with indentations 38 having cavities 40 that receive explosive charges 18 to form shaped charges 44. (Chawla 3:38-49.) Chawla expressly discloses that the liner 36 forms a "housing for carrying shaped charges 44." (Chawla 3:49-50.)

For the reasons discussed above, we reject STI's argument that "charge case" is a term of art with an established special meaning. The Examiner relied on a meaning of "case" that includes a "container." That meaning is not unreasonable or inconsistent with STI's specification. A housing that carries shaped charges within cavities contains those shaped charges. The Examiner reasonably determined that Chawla's liner 36 forms a case for shaped charges 44. We reject STI's argument that Chawla's liner 36 does not form a charge case for shaped charges.

Turning to the slot requirement of STI's claim 17, we note that claim 17 is different from claim 1 in that the slots are not required to cause the case to fracture "in response to the detonation of explosive material." In claim 17, the slots need only render the charge case "adapted to fracture." In that regard, the slot requirement in claim 17 is broader than in claim 1 and can be more easily met.

In Chawla, liner 36 is scored along marks 46 to form "clean breaks" in the liner surface. (Chawla 3:65-67.) The clean breaks allow the liner to be "rolled, folded, fastened, or otherwise shaped to create a desired geometric exterior shape for insertion in a wellbore or other target environment."

(Chawla 3:67 to 4:3.) Chawla's Figure 4 shows a liner 36 with multiple score marks 46.

Chawla's Figure 4 is reproduced below:

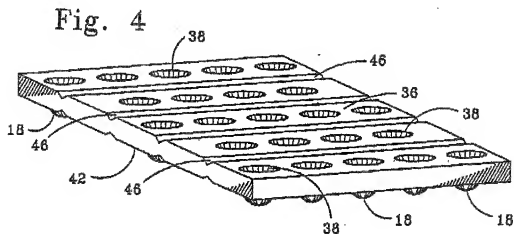


Figure 4 depicts a planar liner 36 that has multiple score marks 46 between rows of shaped charges. (Chawla 3:56-67.)

As shown in Figure 4, the score marks 46 are characterized by an absence of material at portions of the surface of liner 36 so that the liner is thinner at those marks. A person of ordinary skill in the art would have understood that thinner portions of liner with less material have less strength than thicker portions with more material. Thinner portions of the liner that are not as strong will break or fracture more easily than thicker, stronger portions. The Examiner reasonably determined that the score marks 46 in liner 36 are portions about which the liner is "adapted to fracture."

Furthermore, STI argues that the score marks 46 only facilitate breaking of individual liners 36 from a solid sheet. According to STI, the liner shown in Chawla's Figure 4 is not an end product and that the end

product is one in which the individual columns have been broken off along the score marks 46. That argument is not well supported.

Chawla discloses only that the clean breaks along marks 46 are in the surface of the liner. (Chawla 3:66.) Chawla does not disclose that those breaks in the liner surface completely sever liner 36 into separate lesser liner portions having only a single column of shaped charges. None of Chawla's Figures show a liner with less than multiple columns of shaped charges.

Moreover, Chawla discloses that the final geometric shape of the liner can be "planar, oval, spherical, hemispherical, cylindrical, or any desired shape." (Chawla 4:3-7) (emphasis added.) Chawla's Figure 4 shows a liner 36 with a planar shape. (Chawla 4:56-63.) Chawla describes liner 36 as a "single liner." (Chawla 4:5.) The single liner shown in Figure 4 includes multiple breaks in the liner surface along marks 46. Chawla does not disclose that the single, planar liner 36 shown in Figure 4 is not a final planar shape of the liner. As shown in the Figure, in that planar shape, the multiple breaks in the liner surface along marks 46 are still present.

Additionally, Chawla does not disclose that the process of shaping the liner into any other shape removes the score marks. Neither does Chawla disclose that once the liner is shaped, the score marks are then filled in with material and eliminated. We reject STI's argument that Chawla's score marks will no longer exist once the liner is formed into its final shape.

Lastly, we reject STI's argument that the Examiner has not shown that Chawla satisfies the requirement of "providing a perforating string."

The Examiner identified Chawla's Figure 5 as showing the step of "providing a perforating string." Figure 5 shows one embodiment in which a liner 36 is formed into a cylindrical shape suitable for insertion within a

well. (Chawla 4:8-10.) The liner surrounds a detonator 34 and includes a plurality of shaped charges 44 arranged along the length of the liner. (Chawla 4:10-13.) Upon detonation, the plurality of shaped charges 44 produce “perforating jets” that may be oriented in multiple directions to achieve maximum penetrating density within the well. (Chawla 4:20-28.) STI does not explain why there is error in the Examiner’s finding that a teaching of providing an apparatus that produces a plurality of “perforating jets” does not teach “providing a perforating string.”

For all the foregoing reasons, STI has not shown that the Examiner erred in finding that Chawla satisfies all the limitations of claim 17.

We sustain the rejection of claims 17 and 18 under 35 U.S.C. § 102(b) as anticipated by Chawla.

F. CONCLUSION

1) The evidence on this record does not establish that the term “charge case” is a term of art with an established and special meaning in the art.

2) STI has not shown that the Examiner erred in finding that Renfro’s liner 50 forms part of a “charge case.”

3) STI has not shown that the Examiner erred in finding that Chawla’s liner 36 forms a “charge case” and includes slots that are “adapted to fracture.”

G. ORDER

The rejection of claims 1, 7, 17, 22, 23, 25, 27, 28, 30, 33, and 35 under 35 U.S.C. § 102(e) as anticipated by Renfro is affirmed.

The rejection of claims 17 and 18 under 35 U.S.C. § 102(b) as anticipated by Chawla is affirmed.

Appeal 2008-6047
Application 10/027,727

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

MAT

SCHLUMBERGER TECHNOLOGY CORPORATION
14910 Airline Road
P. O. Box 1590
Rosharon TX 77583-1590